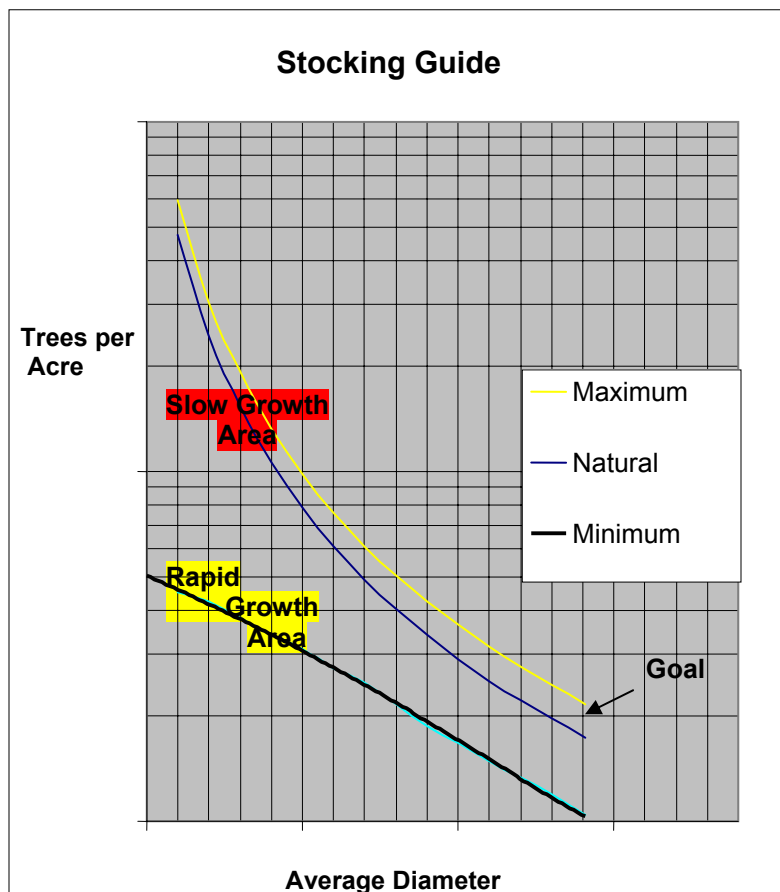


Stocking Guides

The purpose of these guides is to provide a tool for the management of various forest communities in Alaska. These guides were designed to provide the kind of information needed for both long-term management planning, and short-term silvicultural prescriptions for specific forested stand conditions. Forest species composition and tree size change as the stand develops from seedlings, saplings, poles and finally to logs. These guides allow for different quality criteria as the stand progresses from stage to stage. Used for many different forests throughout the world, these guides are based on research done by the USDA Forest Service in Alaska.

The maximum level of forest stocking is based on biological limitations and the minimum stocking level is based on ability of the forested stand to develop naturally into a full stocked stand. These stocking guides are to be used for the production of forest products (timber products). These guides may not be appropriate for Non-commercial timber uses such as wildlife and recreation. .

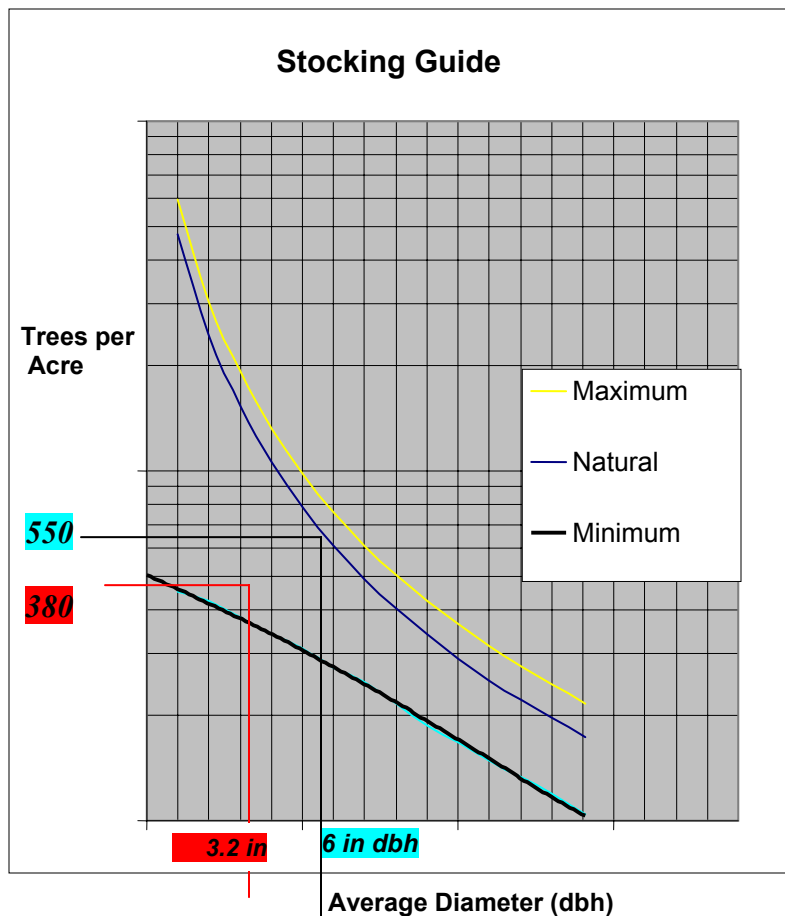


The area between the minimum and maximum stocking is an area of differing growth rates. The closer the forest is to the minimum stocking, the more rapid the growth rate. The closer to the maximum stocking level the slower the growth rate but more trees per acre will be found in the forest. Ideally a forest being managed for maximum growth rates would be maintained at the minimum stocking level. But the maximum number of trees per acre also influences overall production. The ultimate production goal is to arrive at the desired

size and desired stocking in the shortest amount of time, with fewest inputs invested in the forest.

This is often impractical where timber management has a cost of implementation that may or may not be recovered throughout the life of the forest. In Alaska management inputs are often minimal since annual individual tree productivity is secondary to the over production from large forested acres. Cost of removal of trees to maintain the optimal stock often exceeds the value of the product removed. This is an area where practices such as pre-commercial thinning could occur. Incentive programs could be offered to make such operations affordable.

Where this guide is very useful is when you are evaluating a forested stand that is fairly large (of commercial size) and the place on the stocking chart is at the upper levels of stocking.



To use the guide, determine the average diameter of the forested stand being evaluated. This can be done using a number of methods found in the national forestry handbook (NFH). In stratified stands, those that may have two or more age groups of trees, use only the average for that stratum. Example; if the forest has a lush under growth of 1 inch diameter trees towered over by 16 inch diameter trees, separate the results since these are two separate sampling populations.

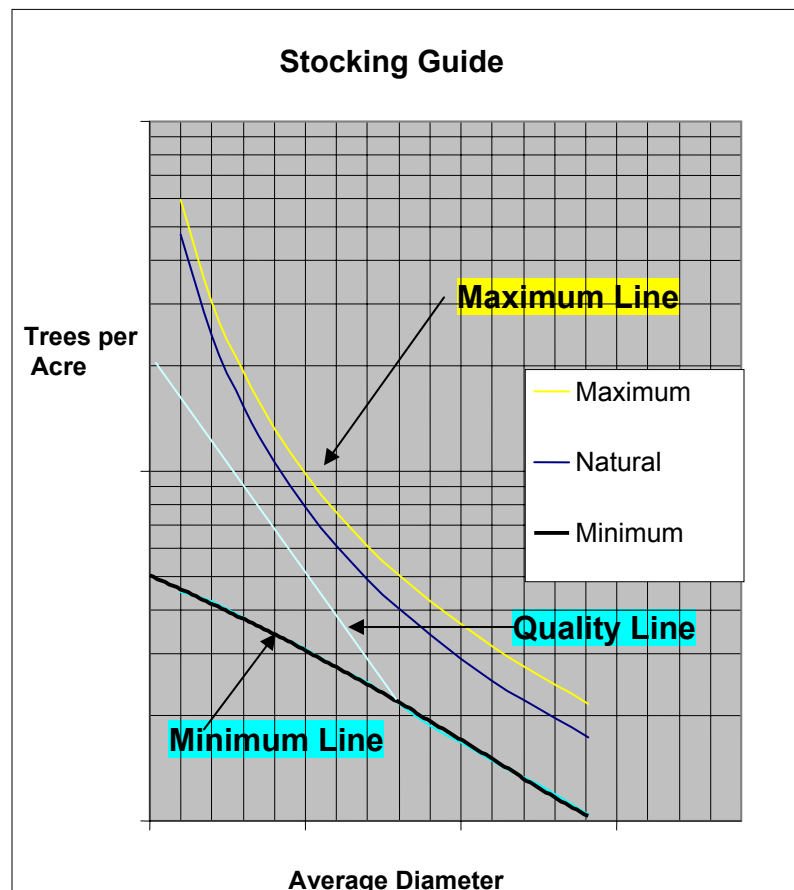
After determining the average tree diameter determine the number of trees per acre, (refer to the NFH) again respecting the sampling conditions for stratified forest conditions and maintaining separate trees per acre for each group within the forest. Please note that the Trees per Acre axis is in a log scale format. (the actual stocking guides have value on the x and y axis) The example above indicates that the stand being evaluated has 550 trees per acre and has an average diameter at breast height (dbh) of 6 inches.

This example stand is fully stocked at 550 trees, at almost the level of a naturally developing forest. If a landowner wished to harvest trees for a saw mill, the planner could recommend that she/he removed 120 of the largest trees per acre reducing the stocking to 380 trees per acre, which also reduces the average diameter to just over 3 inches dbh. This forest would still be adequately stocked but the remaining trees would have much more rapid growth, closer to the minimum stocking level.

The yellow Maximum line indicates levels of over stocking. This is the level that the trees are choking themselves out. This rarely occurs in larger stands but does occur in smaller tree diameters forest. This is where the trees are so dense that the individuals have no growth potential and the trees become stagnant. This condition is often referred to as “dog hair stands”. Natural stands often self thin before reaching this condition, but sometimes as a result of radical disturbance an over abundance of tree regeneration occurs.

The black Minimum line is the lower limit of trees per acre that will allow the stand to develop naturally into much greater stocking, without assistance. These stands usually have ground vegetation that is not similar to the typical forest floor cover for that forest type. This open understory will have shade intolerant herbaceous vegetation and will often prevent natural seeding establishment and maintain an open woodland plant community.

Some stocking guides have an additional line, called the “quality line”. This line represents the minimum stocking to meet a higher quality lumber standard. Trees growing above this line exhibit slower growth but have smaller knots, reduced cracking and splitting in finished lumber and finer grain. Alaska factors that decrease quality in lumber are ice and snow damage, and repeated moose browsing. The white birch stocking guide has a quality line which deals



specifically with moose and snow-ice damage. If snow and ice, and animal damage are common in an area and the objective is high quality hardwood lumber then using the quality line as the target objective is recommended.

Stocking guides are best used with stands greater than 3 inches in diameter. Additionally very old stands, or forest infected by disease and/or logging damage are not well evaluated with this method. In situation of dead, dying or cull trees, it is best to place these in a separate evaluation strata or to completely ignore them in the evaluation process. These trees are important but serve a purpose in the forest, other than timber production.

For stands with mixed species, use the guides for each species in evaluating the entire stand (all species). There are slight variations between desired stocking levels for each species so interpolate as needed. Use different harvest scenarios to see how favoring one species will affect stocking and growth rates.

References

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